Notes on the diet of the Least Honeyguide *Indicator exilis* in eastern Zaire

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During the course of their research in the vicinity of Tshibati (2°14′S, 28°47′E) at 1970 m on the southwestern side of Lake Kivu, in the eastern highlands of Zaire during the 1950's, James P. Chapin and Ruth T. Chapin studied and collected numbers of honeyguides. After analyzing stomachs of Least Honeyguides *Indicator exilis* that had been collected, Dr Chapin prepared a rough manuscript that was later edited somewhat by Mrs Chapin. L.L.S. and J.F.M.H. more recently reviewed that manuscript in the light of their honeyguide studies (Short & Horne 1985), and have expanded upon some sections, particularly checking sexual and age variation in diet. This report is the result, and it is primarily based upon the careful determinations of stomach contents by Dr Chapin, whose endeavours have provided the stimulus for so many African ornithological studies.

The habitats about Tshibati predominantly were mixed:– fire-affected montane bamboo, dry evergreen forest, scrub woodland and bracken woodland above the village; and farmland, scrub woodland, pastures, elephant grass with scattered *Erythrina* trees, old groves of *Cinchona* trees, and a few open marshes below the village. The farm at which the Chapins stayed was near patches of all of these habitat types, varying from small to large.

The Least Honeyguides were collected about artificial bee hives put out to attract various honeyguides at the farm where the Chapins were housed. With their assistants Boniface and Caporali, the Chapins at intervals collected some honeyguides at the hives by using a butterfly net after a honeyguide had entered the hive, the net being then thrust over the entrance and the honeyguide driven out into the net by their activities. By this method the Chapins had obtained their first specimen of the Dwarf Honeyguide *I. pumilio* (Chapin 1958). They also ringed at least a dozen honeyguides, but had little success thereafter in seeing or capturing ringed honeyguides (the collecting may have affected attendance of the honeyguides on the bee hives).

Altogether the Chapins provided data on 30 specimens of *I. exilis pachyrhynchus* collected between March 1955 and February 1958 and information on stomach contents for 26 of them. Least Honeyguides are little known, despite an extensive African range, and these data provide information on a modest sample from a single area over several years, with specimens from all months except June and July. They form the most substantial base yet of information on the diet of the Least Honeyguide.

The 26 Least Honeyguides whose stomach contents were examined by Dr Chapin included 10 adult males, 9 adult females, 3 juvenal males and 4 juvenal females. Of the 26 stomachs, 20 were noted as "well-filled". Significant is the fact that 24 of the 26 stomachs contained moderate to large amounts of wax,

though one of these had only a small amount of wax present. The 2 birds lacking wax in the stomach were adults; all juveniles had managed to obtain wax. The stomachs of all 24 birds that contained wax also held remains of insects or spiders as well. Birds observed to feed on wax had usually spent 20 minutes or less at a feeding, but occasionally one fed more or less continuously on wax for up to 64 minutes. Observations of *I. variegatus, I. indicator* and *I. minor* feeding on wax in Kenya are in accord with the Chapins' observations of *I. exilis* and also of *I. pumilio.* In Kenya (L.L.S. and J.F.M.H.), individuals may at times perch near the wax source for up to 2 hours, but feeding is sustained only for up to an hour, or at most 75 minutes, after which the honeyguides go elsewhere (personal observations of colour-ringed Kenyan honeyguides). All these honeyguides prefer bare fresh wax rather than old or broken wax or wax mixed with honey and larvae or pupae, according to all our observations.

It appears that the Least Honeyguides infrequently, if at all eat bees. Two females each contained possible remains of a single honeybee, and another female contained fragments of a larva that might have been a larval honeybee. Certainly bees did not occur in recognisable numbers in any stomach. It is the experience of all the authors that honeyguides avoid the hives when bees are very active, and when there are 2 hive entrances with bees active at one, the honeyguides use the other entrance. There is no special attention paid to the honeyguides by the bees, but bees in large numbers are too much for the honeyguides, especially the larger honeyguides *I. indicator* and *I. variegatus.* Another point in relation to the hives, and wax sources generally, is that small honeyguides (*I. exilis* noted by the Chapins, *I. minor* and *I. meliphilus* by L.L.S. and J.F.M.H.) readily enter very small holes or cracks in the hive that are too small for the larger honeyguides.

Overall, the contents of the stomachs of the Least Honeyguides contained, in addition to beeswax and possibly a bee or two, spiders, orthopterans, dipterans and their eggs, coloeopterans, ants, termites, leaf-hoppers, caterpillars, larvae that were indeterminate, plant stems, a few fibres, and ''silk'', most likely from the lepidopterous waxworms *Galleria melonella* that associate with bee-hives and eat beeswax (several wax-worm caterpillars were found in the same stomach, that of a juvenal male, containing the silk).

Spiders are represented in but 5 stomachs, but 3 of these (all females) contained more than one species of spider among them. Only a few orthopterans were found, in 3 stomachs. Dipterans were identified in 8 stomachs of males, females and juveniles; in at least 3 of these the remains were tipulid-like, and in 2 cases the dipterans were associated with egg masses. Coleopterans were found in 6 stomachs of females and juveniles but not certainly in any adult male. Termites and leafhoppers were noted only in one stomach each. Caterpillars were found in 2 stomachs each of males, females and juveniles, with unidentified larvae found in 3 additional females and one other juvenile. All stomachs contained some to many insects or spiders or both. Pieces of plant stems in 3 stomachs measured as much as 7 mm in length, and were probably ingested accidentally as the honeyguides seized insects. Fibres were noted in only one stomach.

As always, a great majority of the insects were so finely ground and fragmented that they could not be identified, even to order. In 14 stomachs the

insects (and spiders?) were noted as occurring in masses, some partly digested, and others in tiny fragments. Most of the insects and spiders seem likely to have been obtained through gleaning on the bark or in the foliage of trees and bushes. The dipterans, some beetles, some orthopterans and perhaps spiders and the leafhoppers could have been taken by flycatching, which we have seen this honeyguide perform; or when flushed by gleaning honeyguides that then jumped at them or made a short aerial sally to take them.

The Chapins and their collectors also examined 13 stomachs of *I. pumilio* obtained about the same hives (Chapin 1958), all of which contained at least some wax particles, 10 of them being moderately to well-filled with wax. All 13 stomachs also contained insects, but the mass of the latter exceeded that of the wax in only 3 stomachs. Many of the insects could not be determined but those in 6 stomachs largely were coleopterous, including at least one weevil. Other remains included: small ants in 2; one leafhopper; and larval remains possibly of caterpillars in several. Three tiny spiders were found in each of 3 stomachs. One stomach contained 6 white fragments of the shell of a tiny snail. From these less extensive data it seems that the diet of the Dwarf Honeyguide is very like that of the larger Least Honeyguide (Chapin's weights of the 2 species are 9-15 gms for *I. pumilio,* and 15-22 gms for *I. exilis* at Tshibati).

The presence of insects and spiders usually in numbers in all stomachs examined by Dr Chapin is in accord with the Least Honeyguide, the Dwarf Honeyguide and other honeyguides (Friedmann 1955), all being known not to rely entirely on wax, even when the wax is freely available. With individually marked birds in Kenya, L.L.S. and J.F.M.H. found that honeyguides, once they have fed on wax for a period, usually do not return for several hours. This interval varies depending upon dominance, as subordinate birds tend to return frequently to a wax source after perhaps perching waiting nearby for long periods, if deterred by the presence of dominant conspecific individuals, or of dominant species. Also, heavy eating of wax is associated with frequent drinking (Short & Horne, unpubl.). Some honeyguides that feed at a wax source daily appear only once or twice a day, and others show up irregularly every few days.

In addition to the 26 for which there was information on stomach contents, 2 more adult females and an additional 2 juvenal males were collected. Females with clear indications of breeding (enlarged ova, egg in oviduct, enlarged oviduct) were collected April-May, September, and January-February, and juveniles August-February. All but one adult male had testes measuring over 3.5 mm during March, May, September, October and January. The breeding season thus is long, and individuals are ready to breed or can become so (with well-developed gonads) readily. Chapin's notes suggest that the period of the moult, from September to November, is the low point of breeding activity of Least Honeyguides at Tshibati. It is significant that only one juvenal female, collected in August, had a tiny ovary; each of the others (collected October-November) had an ovary measuring 4.5 by 2-3 mm. Also, 4 of the 5 juvenal males had testes at 2 mm or more from October to February, and only one had small testes (1.5 x 1 mm). Data from the juveniles thus suggest that they may be able to breed at an early age, perhaps before attaining the adult plumage. Finally, Dr Chapin noted consistent asymmetry of the testes of all but one male, the asymmetry favouring the right testis in 5 and the left testis in 4

males. Testicular asymmetry is widespread in piciforms (Chapin 1939, Short 1982).

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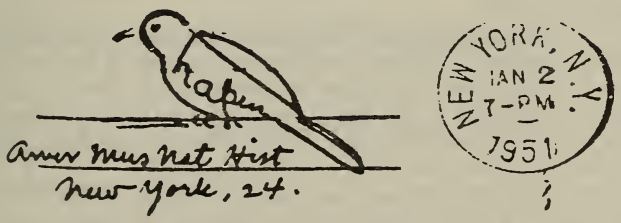
James P. Chapin's well-known colophons always embellished one's realisation of the special attention he devoted to a reply to any letter or note which he received. The colophon of a honeyguide (*Indicator* spp.) herewith is one of a series of birds perched or in flight penned by Chapin in New York above his address on the outside of aerogrammes to Herbert Friedmann in late 1950 and early 1951. At this time Friedmann was studying honeyguides in southern Africa, regularly communicating with Chapin, who also had a deep interest in them. Chapin's excited discourses often instantly followed the arrival of a new Friedmann letter, for Chapin carefully noted the full date on every letter he received (he ever was meticulous in field studies, research, specimen preparation and correspondence) and his replies frequently were dated the same day Friedmann's letters arrived. This lengthy correspondence shows a development of Friedmann's deductions on honeyguides and Chapin's influence on his ideas (in his 1955 monograph on the honeyguides, Friedmann made "particular mention of the helpful and critical cooperation given by James P. Chapin, our leading expert on African birds" – US Nat. Mus. Bull. 208: VI). So Chapin's honeyguide colophons like that shown here reflect both his special charm, and the important interplay between Chapin and one of his major correspondents. It is a pleasure to share this memory of Jim with the reader.



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